

### **REMARKS**

Claims 1-16 are presently pending in the application. In this paper, claims 14 and 15 have been amended, and no claims have been canceled. Accordingly, claims 1-16 are currently pending.

In the October 31, 2006 Office Action, all of the pending claims were rejected. More specifically, the status of the application in light of this Office Action is as follows:

(A) Claims 1-4, 6-7, 9-10, 12-13, and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by MIT M.S. Thesis, 2001 written by Hsiao ("Hsiao");

(B) Claims 14 and 15 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Sieler et al ("Sieler") (Phys. Med. Biol. 45 (2000) N103-N110); and

(C) Claims 5, 8, and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable under Hsiao.

A. **Response to Section 102 Rejection of Claims 1-4, 6-7, 9-10, 12-13, and 16**

Claims 1-4, 6-7, 9-10, 12-13, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hsiao. Applicants respectfully traverse this rejection. For the reasons discussed below, Hsiao does not support a Section 102 rejection of these claims. As a result, the Section 102 rejection of these claims should be withdrawn.

Claim 1 is directed toward a receiver that receives a plurality of inputs indicative of a sensed magnetic flux from a marker associated with a patient. The marker is excited by an excitation source. The receiver includes a correlation processor for analyzing the plurality of inputs in a coherent manner. As disclosed in the specification, the correlation processor further acts on the plurality of inputs to localize a marker in three-dimensional space. Hsiao's tag is not designed to be localized, contrarily; Hsiao's tag is designed to be detected irrespective of its position or orientation. Similarly, claims 9, 12 and 16 are

directed toward systems for locating a marker including: an excitation source for exciting a marker; a sensing array that includes a plurality of sensing coils; and a receiver for analyzing the plurality of receiver inputs in a coherent manner.

Hsiao is directed toward a tracking system for magnetically-resonant passive tags used primarily in musical and graphical applications. Hsiao discloses detecting systems designed with a receiver that receives only one input and has only one sense coil ("detection coil") for detecting a ringdown tag reader. Hsiao further discloses a detection system having a swept-frequency tag reader that utilized either a single sensor coil or a 6 coil configuration in the shape of a cube that must surround the tag. Hsiao teaches that the ringdown reader first transmits a magnetic pulse, then stops the pulse, and finally, listens for a ringdown signal at the frequency of the tag (Hsiao; pg 14, ¶3, pg 15, ¶1). Additionally, Hsiao teaches use of a quadrature demodulator to determine the magnitude of the received signal that was in-phase and magnitude of the received signal that was ninety degrees out-of-phase (Hsiao; pg 19, ¶2).

Hsiao does not support a Section 102 rejection of claim 1 because Hsiao fails to disclose several features of this claim. For example, Hsiao does not disclose a receiver that receives more than one input or is able to analyze a plurality of inputs. In order to localize a marker in three-dimensions, multiple coils must be used as is taught, disclosed and claimed in the present application. Further, Hsiao does not teach or disclose localization of a tag or marker. Rather, Hsiao teaches and discloses a system and method of *detecting* a tag by measuring the "proximity" or "proximity and inclination" of a tag relative to the coil (Hsiao, pg 19, ¶2; pg 20 ¶2). As disclosed by Hsiao, multiple locations and inclinations of a detected tag result in the same signal with no means to disambiguate the signals due to the single sensor coil configuration taught and disclosed by Hsiao. Thus, Hsiao teaches and discloses a detection system that provides a response signal if the tag is in the proximity of the sensor in a binary on/off or proximate/not proximate

manner. Hsiao however, does not and cannot analyze a plurality of inputs for providing localization data of a marker.

Furthermore, the quadrature processor of Hsiao is not equivalent or interchangeable with the correlation processor taught and claimed in the current application, and if the quadrature processor of Hsiao were exchanged for the coherent processor taught and disclosed in the current application, the invention would be rendered inoperable for its intended purpose. In summary, a quadrature processor can be considered part of a coherent receiver, or can potentially be a non-required component of a correlation processor, but a correlation processor is a narrower term of art that implies a specific processing technique as is known by those skilled in the art. Hsiao fails to disclose several features of independent claim 1, 9, 12 and 16 and therefore, these independent claims patentably distinguish over Hsiao. Claims 2-4, 6-7, 10, 12 and 13 depend from the independent claims. As a result, these dependent claims are also patentable over Hsiao for the reasons discussed above and for the additional features of these claims.

Claim 16 is further patentable over Hsiao because claim 16 recites "an excitation source for emitting waveform at a first frequency" and the "exciting waveform causing said marker to resonate at a second frequency." Hsiao does not teach or disclose a first and a second frequency, rather, Hsiao contrarily emphasizes that the excitation frequency must match the resonate frequency of each tag. (Hsiao, pg 19, ¶12) Hsiao states that "the frequency of the receive signal had to be identified, to determine whether it was identical to the frequency sent out in the ping. (Hsiao, pg 19, ¶12) Hsiao therefore fails to teach or disclose the first and the second frequency of the claimed invention. As a result, these claims are patentable over Hsiao for these reasons and for the additional reasons discussed above, and are therefore in condition for allowance.

**B. Response to Section 102 Rejection of Claims 14 and 15**

Claims 14 and 15 were rejected under 35 U.S.C. § 102(b) as being anticipated by Sieler et al ("Sieler") (Phys. Med. Biol. 45 (2000) N103-N110). Applicants respectfully traverse this rejection. Claims 14 and 15 have been amended to clarify that the marker is a wireless marker. The system disclosed in Sieler is not capable of operating wirelessly and thus the applicants respectfully submit that these amended claims are patentable over Sieler and are in condition for allowance.

**C. Response to Section 103 Rejection of Claims 14 and 15**

Claims 5, 8 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable under Hsiao. Applicants respectfully traverse this rejection. Claims 5, 8 and 11 depend from independent claims discussed above with respect to the § 102 rejection in view of Hsiao. For the reasons set forth above with respect to the independent claims from which these claims depend, Hsiao does not support a Section 103 rejection of these claims. As a result, the Section 103 rejection of these claims should be withdrawn.

The Examiner admits that Hsiao teach a "sine wave oscillator" (Hsiao, pg 28, ¶2) but does not teach of using a triangular wave. The Examiner further notes that the disclosure of the current application teaches that other waveforms can be utilized (Appl., pg 13, ¶1) and concludes that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the triangular waveform with the Hsiao system. Assuming for the moment that this is true, the Examiner's statement still does not correct the deficiencies of Hsiao as discussed above, and therefore, claims 5, 8, and 11 are patentable over Hsiao and are in condition for allowance.

D. Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicant respectfully requests reconsideration of the application and a mailing of a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-6088.

Applicant believes no additional fee is due with this response. However, if additional fees are due, please charge our Deposit Account No. 50-0665, under Order No. 341148018US from which the undersigned is authorized to draw.

Dated: April 30, 2007

Respectfully submitted,

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